



FOR YOUR INFORMATION

Synthetic Pyrethroids for Mosquito Control

**EPA evaluates and
licenses pesticides**

The Environmental Protection Agency (EPA) evaluates and registers (licenses) pesticides to ensure they can be used safely. These pesticides include products used in the mosquito control programs which states and communities have established. To evaluate any pesticide, EPA assesses a wide variety of tests to determine whether a pesticide has the potential to cause adverse effects on humans, wildlife, fish and plants, including endangered species and non-target organisms.

**mosquito officials
select control
measures that best
suit local conditions**

Officials responsible for mosquito control programs make decisions to use pesticides based on an evaluation of the risks to the general public from diseases transmitted by mosquitoes or on an evaluation of the nuisance level that communities can tolerate from a mosquito infestation. Based on surveillance and monitoring, mosquito control officials select specific pesticides and other control measures that best suit local conditions in order to achieve effective control of mosquitoes with the least impact on human health and the environment. It is especially important to conduct effective mosquito prevention programs by eliminating breeding habitats or applying pesticides to control the early life stages of the mosquito. Prevention programs, such as elimination of any standing water that could serve as a breeding site, help reduce the adult mosquito population and the need to apply other pesticides for adult mosquito control. Since no pesticide can be considered 100% safe, pesticide applicators and the general public should always exercise care and follow specified safety precautions during use to reduce risks. This fact sheet provides basic information on synthetic pyrethroids, a class of insecticides used in mosquito control programs.

What are Synthetic Pyrethroids?

Pyrethroids are synthetic chemical insecticides that act in a similar manner to

**synthetic
pyrethroids are
commonly used for
mosquito control**

pyrethrins, which are derived from chrysanthemum flowers. Pyrethroids are widely used for controlling various insects. **Permethrin**, **resmethrin** and **sumithrin** are synthetic pyrethroids commonly used in mosquito control programs to kill adult mosquitoes.

- < **Permethrin** has been registered by EPA since 1977. It is currently registered and sold in a number of products such as household insect foggers and sprays, tick and flea sprays for yards, flea dips and sprays for cats and dogs, termite treatments, agricultural and livestock products, and mosquito abatement products.
- < **Resmethrin** has been registered by EPA since 1971, and is used to control flying and crawling insects in the home, lawn, garden, and at industrial sites. It can also be used to control insects on ornamental plants (outdoor and greenhouse use), on pets and horses, and as a mosquitocide. Resmethrin is a Restricted Use Pesticide (RUP) which is available for use only by certified pesticide applicators or persons under their direct supervision because of its toxicity to fish.
- < **Sumithrin** has been registered by EPA since 1975, and is used to control adult mosquitoes and used as an insecticide in transport vehicles such as aircraft, ships, railroad cars, and truck trailers. It is also used as an insecticide and miticide in commercial, industrial, and institutional non-food areas, in homes and gardens, in greenhouses, and in pet quarters and on pets.

**tiny ultra-low
volume (ULV)
droplets kill
mosquitoes on
contact**

**How are Synthetic Pyrethroids
Used in Mosquito Control?**

Most pyrethroid mosquito control products can be applied only by public health officials and trained personnel of mosquito control districts. Mosquito control professionals apply pyrethroids

Mosquito Life Cycle

egg - hatch when exposed to water;

larva - (pl. - larvae) lives in the water; molts several times; most species surface to breathe air;

pupa - (pl. - pupae) non-feeding stage just prior to emerging as adult;

adult - flies short time after emerging and after its body parts have hardened.

as an ultra low volume (ULV) spray. ULV sprayers dispense very fine aerosol droplets that stay aloft and kill mosquitoes on contact. Pyrethroids used in mosquito control are typically mixed with a synergist compound called piperonyl butoxide, which enhances the effectiveness of the

Centers for Disease Control and Prevention

active ingredient. The product is applied at rates of between 0.003 and 0.007 pounds of active ingredient per acre which is equivalent to 2 to 3.5 fluid ounces of the mixed formulation per acre.

Do pyrethroids pose risks to human health?

pyrethroids do not pose unreasonable risks to human health

Pyrethroids can be used for public health mosquito control programs without posing unreasonable risks to human health when applied according to the label. Pyrethroids are considered to pose slight risks of acute toxicity to humans, but at high doses, pyrethroids can affect the nervous system.

Do pyrethroids pose risks to wildlife or the environment?

pyrethroids do not pose unreasonable risks to wildlife or the environment, but are toxic to fish

Pyrethroids used in mosquito control programs do not pose unreasonable risks to wildlife or the environment. Pyrethroids are low in toxicity to mammals, and are practically non-toxic to birds. Mosquito control formulations of permethrin quickly break down in the environment, and high temperatures and sunlight accelerate this process. However, pyrethroids are toxic to fish and to bees. For that reason, EPA has established specific precautions on the label to reduce such risks, including restrictions that prohibit the direct application of products to open water or within 100 feet of lakes, streams, rivers or bays.

What is The Current Regulatory Status of Pyrethroids?

EPA will review pyrethroids in approximately 2002

As part of its responsibility to reassess all older pesticides registered before 1984, EPA has given highest priority to reviewing more acutely toxic pesticides such as organophosphates and carbamates. Organophosphates are currently under review. Comprehensive reviews of the synthetic pyrethroids are scheduled

for approximately 2002.

**Where Can I Get
More Information
About Pyrethroids and
Mosquito Control?**

For information about mosquito control in your area, contact your state or local health department. The federal Centers for Disease Control and Prevention is also a source of information on disease control, and their internet website includes a listing of state health departments. To contact the:

**Centers for Disease
Control and Prevention
(CDC)**

Telephone:

970-221-6400

Fax: 970-221-6476

E-mail: dvbid@cdc.gov

web site:

<http://www.cdc.gov>

mosquito control professionals

federal pesticide program office

10 EPA regional offices

**national toll-free
pesticide hotline**

Information on pesticides used in mosquito control can be obtained from the state agency which regulates pesticides, or from the **National Pesticide Telecommunications Network (NPTN)**. The NPTN website includes links to

all state pesticide regulatory agencies. Toll-free hotline: 1-800-858-7378, standard hours are 9:30 a.m. to 7:30 p.m. Eastern time; every day except holidays. Callers outside normal hours can leave a voice mail message, and NPTN returns these calls the next business day.

E-mail:
nptn@ace.orst.edu
Internet web site:
<http://ace.orst.edu/info/nptn>

Information on mosquito control programs can also be obtained from the **American Mosquito Control Association (AMCA)** web site at: **<http://www.mosquito.org>**. This site also lists many county mosquito agencies.

For more information on EPA's program to regulate pesticides, contact:

**EPA Office of
Pesticide Programs
(OPP)**
Telephone:
703-305-5017
Fax: 703-305-5558
E-mail:
opp-web-comments@epa.gov
Internet web site:
<http://www.epa.gov/pesticides>

EPA Region I - CT, MA, ME, NH, RI, VT
888-372-7341
www.epa.gov/region01

EPA Region II - NJ, NY, PR, VI
732-321-4391
www.epa.gov/region02

EPA Region III - DE, DC, MD, PA, VA, WV
800-438-2474
www.epa.gov/region03

EPA Region IV - AL, FL, GA, KY, MS, NC, SC, TN
800-241-1754
www.epa.gov/region4

EPA's 10 Regional Offices are also a source of pesticide information, as well as on pesticide program activities in the individual regions.

www.epa.gov/region7

EPA Region VIII - CO, MT, ND, SD, UT, WY
800-227-8917 (Region VII only) or **303-551-7020**
www.epa.gov/region08

EPA Region IX - AZ, CA, HI, NV, AS, GU
415-744-1500
www.epa.gov/region09

EPA Region X - AK, ID, OR, WA
800-424-4372 (Region X only) or **206-553-1200**
www.epa.gov/r10earth

**EPA Region V - IL,
IN, MI, MN, OH, WI**
800-621-8431
(Region V only) or **312-
353-2000**

www.epa.gov/region5

**EPA Region VI - AR,
LA, NM, OK, TX**
800-887-6063
(Region VI only) or **214-
665-6444**

www.epa.gov/region6

**EPA Region VII - IA,
KS, MO, NE**
800-223-0425 or
913-551-7020

Other Helpful EPA Publications

For Your Information - How to Use Insect Repellents Safely
(735-F-93-052R)

For Your Information - Mosquitoes: How to Control Them
(735-F-98-003)

For Your Information - Larvicides for Mosquito Control
(735-F-00-002)

For Your Information - Naled for Mosquito Control
(735-F-00-003)

For Your Information - Malathion for Mosquito Control
(735-F-00-001)

Questions and Answers - Pesticides and Mosquito Control